

DRAFT

***THE OZONE WEEKEND EFFECT IN
CALIFORNIA***

DRAFT STAFF REPORT

California Environmental Protection Agency

 **Air Resources Board**

The Planning and Technical Support Division

The Research Division

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DISCLAIMER

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Details of the analyses leading to the summary results presented in this report can be found in the companion Technical Support Document.

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Primary Authors

Jeff Austin
Leon Dolislager
Lawrence C. Larsen
Ash Lashgari
Eileen McCauley
Nehzat Motallebi
Hien Tran

Contributors

Bart Croes
Robert Effa
Michael Franzwa
Norma Montez
Randy Pasek

Reviewed by

Bart Croes

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ABSTRACT

The ozone weekend effect is a tendency for ozone concentrations in some areas to be higher on weekends than on weekdays. These results are counterintuitive in that emissions of ozone precursors are presumably lower on weekends than on weekdays. Air quality data indicate that emissions of both nitrogen oxides (NO_x) and volatile organic compounds (VOCs) – the primary ozone precursors – decline on weekends in almost all locations. Furthermore, NO_x appears to decline more than VOCs. Based on these phenomena, some observers conclude that attainment of ambient air quality standards for ozone would occur more efficiently without regulatory reductions of NO_x emissions.

Regulatory NO_x reductions address a variety of air pollutants in addition to ozone, including nitrogen dioxide, particulate nitrates (a major constituent of $\text{PM}_{2.5}$), and nitric acid. Although lower NO_x tends to reduce these pollutants, the report focuses on the causes of the ozone weekend effect.

Analyses show the ozone weekend effect is common in some California air basins but not in others. In addition, California's long-term strategy of simultaneous reductions of VOCs and NO_x has been highly successful at reducing ozone levels on all days of the week in areas where the ozone weekend effect is the strongest.

The report outlines several possible causes of the ozone weekend effect, and evaluates the consistency of the available data with each one. Six possible causes were evaluated, and four were considered plausible as significant contributors to the ozone weekend effect. The plausible causes were NO_x reductions, different timing of emissions including NO_x , different amounts and impacts of pollutants that persist overnight aloft, and different amounts of light-absorbing particulate matter in the air.

The report concludes that the available data are not sufficient to determine the alternative causes that are responsible. Recommendations for further research are offered to elucidate the factors contributing to the ozone weekend effect. At this time, the scientific evidence regarding the ozone weekend effect does not demonstrate that regulatory NO_x reductions lead to increases in ambient ozone concentrations.

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